AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

1 1. (Previously Presented) A method of selecting a heuristic class for data placement 2 in a distributed storage system comprising the steps of: 3 forming an integer program for each of a plurality of heuristic classes, 4 each of the heuristic classes providing a technique for placing data within the 5 distributed storage system, each of the integer programs comprising an 6 objective of minimizing a replication cost for placing the data; 7 solving each of the integer programs which provide the replication cost for 8 each of the heuristic classes; and 9 selecting the heuristic class having a low replication cost. 1 2. (Previously Presented) A method of selecting a heuristic class for data placement 2 in a distributed storage system comprising the steps of: 3 forming a general integer program which models placing data within the 4 distributed storage system; 5 forming a specific integer program which models a heuristic class that 6 provides a technique for placing the data within the distributed storage system, 7 the general and specific integer programs each comprising an objective of 8 minimizing a replication cost for placing the data; 9 solving the general integer program which provides a general lower bound 10 for the replication cost; 11 solving the specific integer program which provides a specific lower 12 bound for the replication cost; and 13 selecting the heuristic class if a difference between the general lower 14 bound and the specific lower bound is within an allowable amount.

(Original) The method of claim 2 wherein inputs used in the steps of forming the

general and specific integer programs comprise a system configuration, a workload,

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- and a performance requirement.
- 1 4. (Original) The method of claim 3 wherein the performance requirement comprises
- 2 a bi-modal performance metric.
- 1 5. (Original) The method of claim 4 wherein the bi-modal performance metric
- 2 comprises a criterion and a ratio of successful attempts to total attempts.
- 1 6. (Original) The method of claim 3 wherein the performance requirement comprises
- 2 a data access latency.
- 1 7. (Original) The method of claim 3 wherein the performance requirement comprises
- 2 a data access bandwidth.
- 1 8. (Original) The method of claim 3 wherein the performance requirement comprises
- 2 a data update time.
- 1 9. (Original) The method of claim 3 wherein the performance requirement comprises
- 2 an average data access latency.
- 1 10. (Original) The method of claim 3 wherein the performance requirement comprises
- 2 a data availability requirement.
- 1 11. (Original) The method of claim 3 wherein the general integer program comprises
- 2 general constraints which model the data placement irrespective of the heuristic class
- 3 for the data placement.
- 1 12. (Original) The method of claim 11 wherein the general constraints comprise a
- 2 performance constraint which models the performance requirement.
- 1 13. (Original) The method of claim 11 wherein the specific integer program

- 2 comprises the general constraints and a specific constraint.
- 1 14. (Original) The method of claim 12 wherein the specific constraint comprises a
- 2 storage constraint.
- 1 15. (Original) The method of claim 12 wherein the specific constraint comprises a
- 2 replica constraint.
- 1 16. (Original) The method of claim 12 wherein the specific constraint comprises a
- 2 routing knowledge constraint and further wherein the routing knowledge constraint
- models an extent to which a data storage node knows of replicas of data objects
- 4 stored on other data storage nodes.
- 1 17. (Original) The method of claim 12 wherein the specific constraint comprises an
- 2 access knowledge constraint and further wherein the access knowledge constraint
- models an extent to which a data storage knows of access to replicas of data objects
- 4 by clients accessing other data storage nodes.
- 1 18. (Original) The method of claim 12 wherein the specific constraint comprises an
- 2 activity history constraint.
- 1 19. (Original) The method of claim 12 wherein the specific constraint comprises a
- 2 reactive placement constraint.
- 1 20. (Original) The method of claim 3 wherein the system configuration comprises a
- 2 plurality of data storage nodes coupled by a plurality of network links.
- 1 21. (Original) The method of claim 20 wherein the system configuration further
- 2 comprises a plurality of clients coupled to the data storage nodes.
- 1 22. (Original) The method of claim 21 wherein the workload comprises at least some

2	of the clients requesting data objects stored on the data storage nodes.
1	23. (Original) The method of claim 22 wherein the workload further comprises at
2	least some of the clients storing some of the data objects on the data storage nodes.
1	24. (Previously Presented) A method of selecting a heuristic class for data placement
2	in a distributed storage system comprising the steps of:
3	forming a general integer program which models placing data within the
4	distributed storage system;
5	forming a plurality of specific integer programs which model a plurality of
6	heuristic classes, each of the heuristic classes providing a technique for
7	placing the data within the distributed storage system, the general and specific
8	integer programs each comprising an objective of minimizing a replication
9	cost for placing the data;
10	solving the general integer program which provides a lower bound for the
11	replication cost;
12	solving the specific integer programs which provides the replication cost
13	for each of the heuristic classes; and
14	selecting a particular heuristic class correlated to a low replication cost if a
15	difference between the lower bound and the low replication cost is within an
16	allowable amount.
1	25. (Previously Presented) A computer readable memory comprising computer code
2	for implementing a method of selecting a heuristic class for data placement in a
3	distributed storage system, the method of selecting the heuristic class comprising the
4	steps of:
5	forming an integer program for each of a plurality of heuristic classes,
6	each of the heuristic classes providing a technique for placing the data within
7	the distributed storage system, each of the integer programs comprising an
8	objective of minimizing a replication cost for placing the data;
9	solving each of the integer programs which provide the replication cost for

selecting the heuristic class having a low replication cost. 26. (Previously Presented) A computer readable memory comprising computer code for implementing a method of selecting a heuristic class for data placement in a distributed storage system, the method of selecting the heuristic class comprising the steps of:
for implementing a method of selecting a heuristic class for data placement in a distributed storage system, the method of selecting the heuristic class comprising the
for implementing a method of selecting a heuristic class for data placement in a distributed storage system, the method of selecting the heuristic class comprising the
distributed storage system, the method of selecting the heuristic class comprising the
steps of:
forming a general integer program which models placing data within the
distributed storage system;
forming a specific integer program which models a heuristic class that
provides a technique for placing the data within the distributed storage system,
the general and specific integer programs each comprising an objective of
minimizing a replication cost for placing the data;
solving the general integer program which provides a general lower bound
for the replication cost;
solving the specific integer program which provides a specific lower
bound for the replication cost; and
selecting the heuristic class if a difference between the general lower
bound and the specific lower bound is within an allowable amount.
27. (Previously Presented) A computer readable memory comprising computer code
for implementing a method of selecting a heuristic class for data placement in a
distributed storage system, the method of selecting the heuristic class comprising the
steps of:
forming a general integer program which models placing the data within
the distributed storage system;
forming a plurality of specific integer programs which model a plurality of
heuristic classes, each of the heuristic classes providing a technique for
placing the data within the distributed storage system, the general and specific
integer programs each comprising an objective of minimizing a replication
cost for placing the data;

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12	solving the general integer program which provides a lower bound for the
13	replication cost;
14	solving the specific integer programs which provides the replication cost
15	for each of the heuristic classes; and
16	selecting a particular heuristic class correlated to a low replication cost if a
17	difference between the lower bound and the low replication cost is within an
18	allowable amount.